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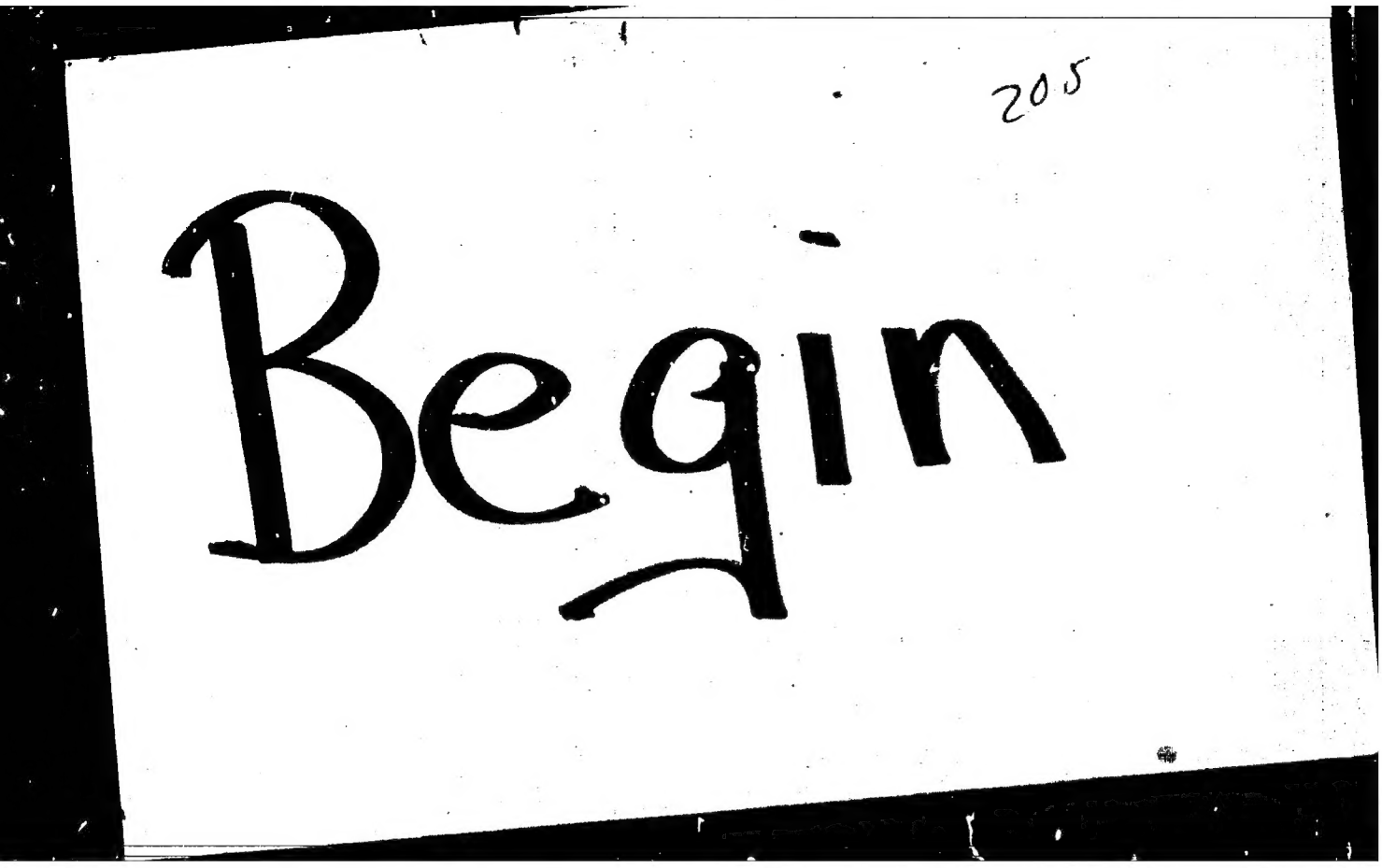

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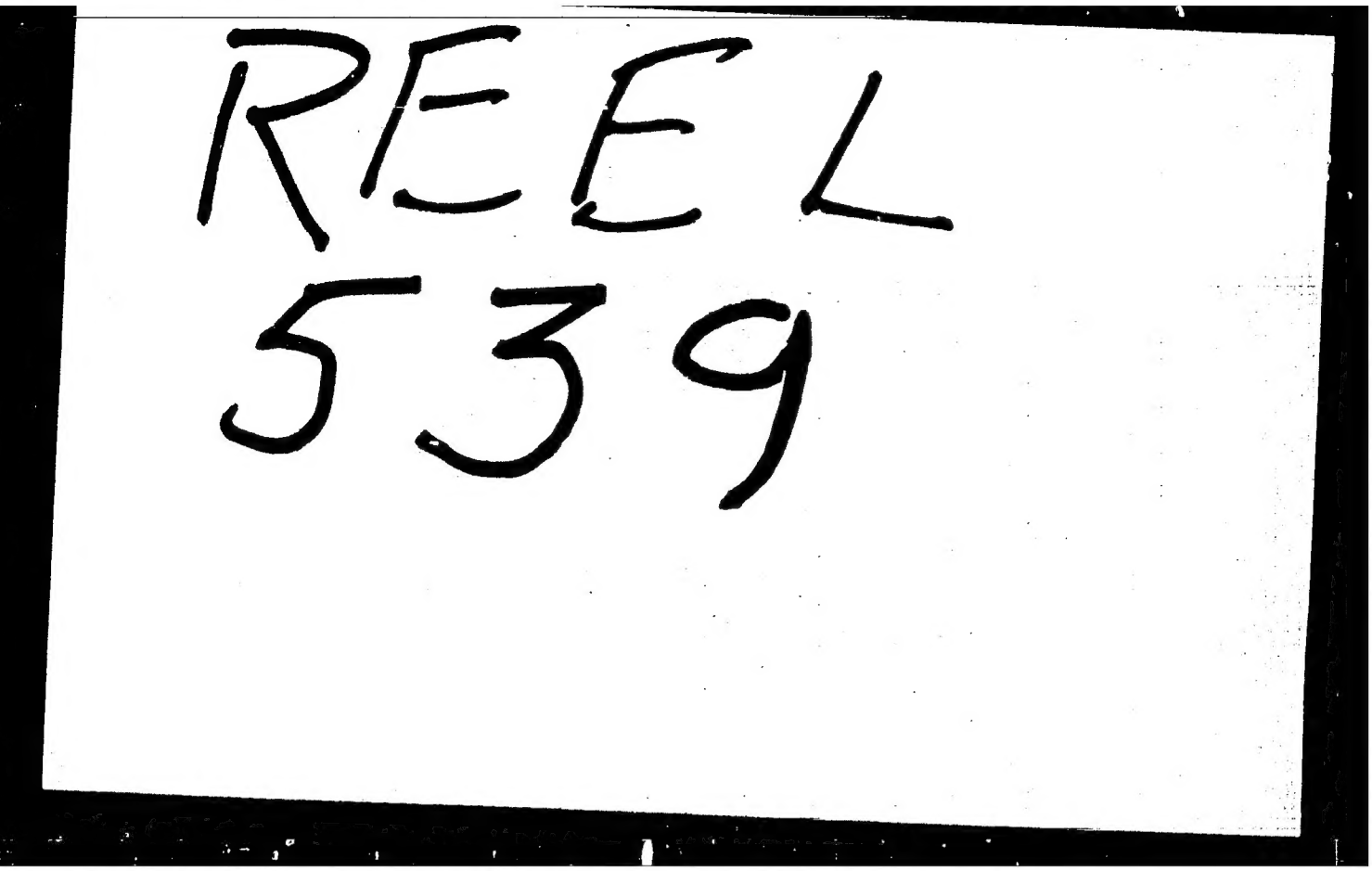

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

S/137/62/000/009/018/033
A006/A101

AUTHOR: Solonitsyn, B. M.

TITLE: The use of special steel for scale-resistant fittings of tubular furnaces

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 9, 1962, 76 - 77, abstract 9I466 ("Novosti neft. i gaz. tekhn. Neft. oborud. i sredstva avtomatiz.", 1962, no. 2, 28 - 32)

TEXT: X 24H 7 (Kh24N7) type steel, (containing in %: C 0.35 - 0.5, Mn 0.5 - 1.0, Si 0.5 - 1.5, P ≤0.03, S ≤0.03, Cr 22 - 25, Ni 6.0 - 8.0), was investigated for the purpose of establishing the optimum chemical composition of steel with reduced Ni content, assuring high scale resistance and mechanical properties such as 3И-316 (EI-316) steel and steels containing (in %): Ni 7 - 13, Cr 20 - 30 and C 0.2 - 0.7. A Cr content as high as 22 - 25% assures fully the required scale resistance, its further increase causes only an increase of ferrite in the metal structure. This impairs the mechanical properties of the steel, in particular, after long holding at high temperatures. The authors carried out comparative tests of the mechanical properties of Kh24N7 and EI-316 steels. The

Card 1/2

high-temperature tubular furnaces of oil refineries.

T. Rumyantseva

[Abstracter's note: Complete translation]

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Card 2/2

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; SHILENKOV, V.N.; V'YUGOV, G.I.; STAKHANOV, A.N.; SOLONITSYN, B.P.

Effect of air pressure in boreholes on pneumatic hammer performance. Izv. AN Kazakh. SSR. Ser. gor dela no.2:89-92 '58. (MIRA 12:10)

(Boring machinery)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; SHILENKOV, V.N.; STAKHANOV, A.N.; SOLONITSYN, B.P.; V'YUGOV, G.I.

Dust suppression with a water and air mixture during pneumatic impact boring. Izv. AN Kazakh. SSR. Ser. gor. dela no.1:104-108 '59. (MIRA 12:9)

(Boring) (Drilling fluids)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; TSOY, S.; STAKHANOV, A.N.; SOLONITSYN, B.P.

Dust removal in underground mechanical ore crushing plants. Izv. AN Kazakh. SSR. Ser.gor.dela no.2:88-95 '60. (MIRA 13:10)
(Mine dusts) (Dust--Removal)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; SOLONITSYN, B.P.; STAKHANOV, A.N.

Methods of mine dust control and their classification. Trudy Inst. gor. dela AN Kazakh. SSR 4:148-157 '60. (MIRA 13:9)
(Mine dusts) (Dust collectors)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; TSOY, S.; SOLONITSYN, B.P.

Removing dust from underground mechanical ore-crushing chambers.
Trudy Inst.gor.dela AN Kazakh.SSR 9:181-187 '62. (MIRA 15:3)
(Mine dusts—Removal)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KEKIN, A.A.; TSOY, S., SOLONITSYN, B.P.

Condensation settling of dust in suspension. Trudy Inst.gor.dela AN Kazakh.SSR 9:198-204 '62. (MIRA 15:8)
(Mine dusts—Removal)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

AUTHOR: Solonitsyn, Yu. P. SOV/76-32-6-8/46

TITLE: The Photosorption of Oxygen on Silicagel and Crystalline Quartz (Fotosorbtsiya kisloroda na silikagele i kristallicheskom kvartse)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp 1244-1247 (USSR)

ABSTRACT: In some cases pressure rises were observed in the reaction vessel with photomanometric methods in spite of a pre-treatment, even at an illumination of the empty cuvette. As the cuvette consists of cast quartz, the experiments mentioned in the title were conducted to clarify the behavior of the quartz. It may be seen from the experimental part and a schematic figure of the equipment that a Pirani-manometer was used in the experiments with silicagel. The pressure changes were recorded continuously with a mirror-galvanometer. As a source of illumination a spark discharge between electrodes made of different metals was used. The aerosilicagel was prepared according to the method by Kistler (Ref 5). It was found that the gaseous oxygen is not activated, i.e. that this process is of no particular importance. Further experiments

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

The Photosorption of Oxygen on Silicagel and Crystalline Quartz

showed that an admixture is contained in the adsorbent. The occurrence of a phosphorescence at wave lengths below 250mμ is considered to be due to this fact, no phosphorescence being observed after an annealing of the silicagel at 600° in oxygen. A photosorption of oxygen, however, was observed even after annealing. An adsorption of acetone vapors completely annihilated the photosorption, this effect being also attained by steam. After the removal of steam the photosorption continues, which is not the case with acetone vapors. It is therefore assumed that a connection exists with the OH-groups of the surface, that is to say a photodissociation of the binding Si-OH and the formation of free radicals Si-O-O, the possibility of various secondary reactions being given. As even Weyl (Ref 9) pointed to a photosorption of oxygen on quartz powder, corresponding experiments were conducted in a special container, a figure of which is given. It was found that no photosorption takes place on samples treated with water. On the other hand, the same phenomena occurred as with silicagel. In particular it is pointed to the breaks in some barographs of photosorption. This work was conducted under the direction of A. N. Terenin, Member, Acad-

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30V/ [illegible] to

The photosorption of oxygen on silicagel and [illegible]

demy of Sciences, USSR. There are 9 figures and [illegible] ref erences, 9 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: January 16, 1957

1. Oxygen--Adsorption 2. Silicon dioxide--Adsorptive properties
3. Quartz--Adsorptive properties 4. Light--Chemical effects

Card 3/3

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

AUTHOR: [illegible] 76-[illegible]

TITLE: [illegible] Oxygen From Zinc Oxide [illegible]

SOURCE: [illegible] Khimii, 1958, Vol [illegible], Nr 9, pp [illegible]

ABSTRACT: [illegible] is freed from zinc oxide through ultra-violet radiation and the amount released is measured manometrically. Figure [illegible] shows the experimental set-up. [illegible] SVDSh-[illegible] UV lamp with a UFS [illegible] black filter was used. The results yielded several [illegible]grams (pressure-time graphs). The effect cannot be explained simply in terms of a heating of the sample. It only happens for a longer period of time if a very small excess of zinc is present in the zinc oxide. In that case molecular oxygen is given off. The adsorption of water vapor has no definite effect on the photodesorption of oxygen.
The work was carried out under the management of [illegible]. N. Terenin, Member, AS USSR.
There are [illegible] figures and 14 references. 11 of which are Soviet.

Card 1/[illegible]

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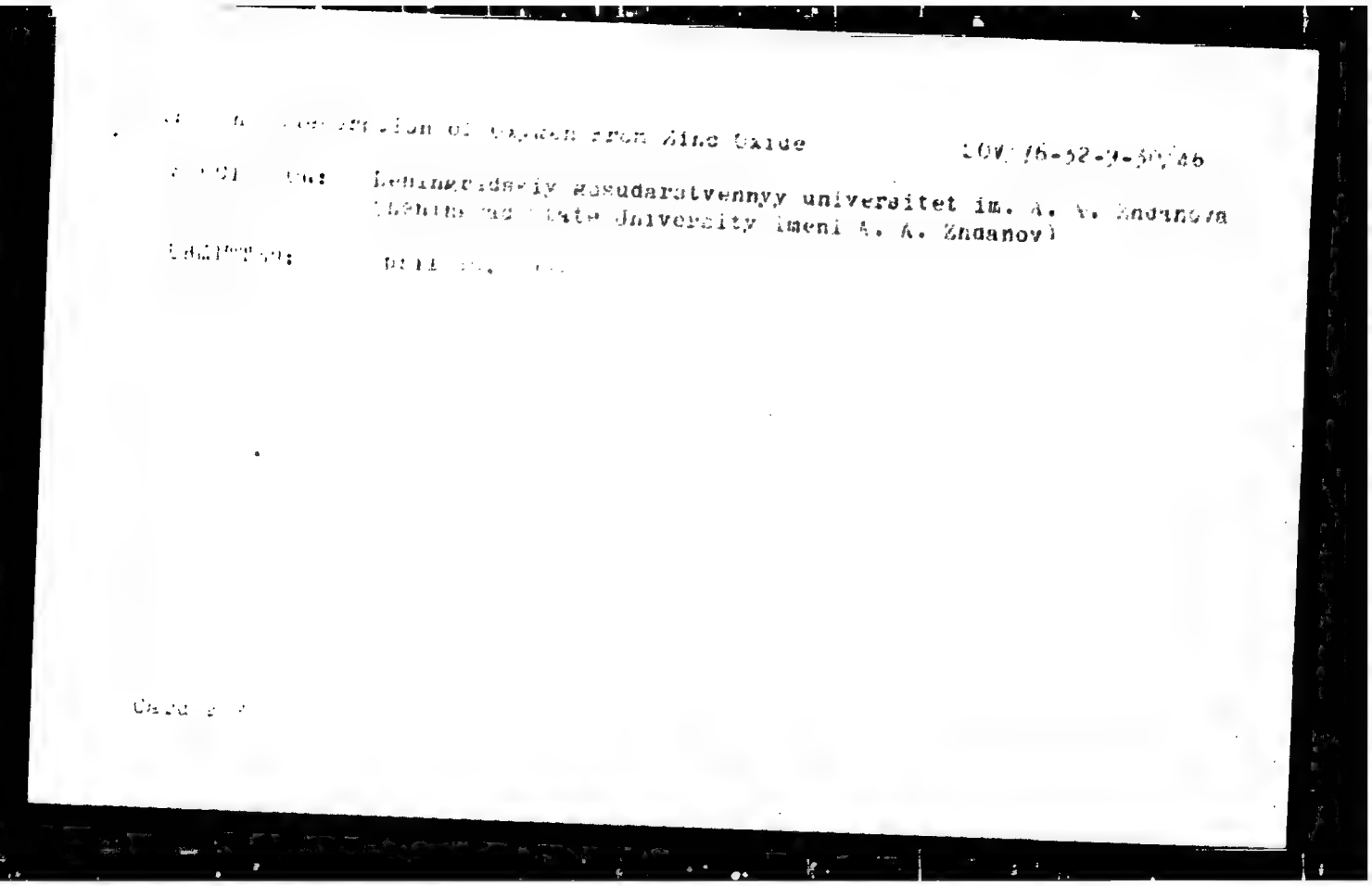

[illegible] Reduction of Oxygen from Zinc Oxide

SOV/76-32-9-39/46

[illegible]: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

[illegible]:

[illegible]

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLONITSYN, Yu.P.

Photosorption of oxygen and structure of the surface of silicate catalysts. Probl. kin. i kat. 10:292-293 '60. (MIRA 14:5)

1. Laboratoriya fotosinteza Nauchno-issledovatel'skogo fizicheskogo instituta Leningradskogo gosudarstvennogo universiteta.
(Oxygen) (Silicates) (Catalysts)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLONITSYN, Yu.P.

Photosorption of oxygen on zinc oxide. Spectral and temperature dependence of the photosorption rate. Zhur. fiz. khim. 36 no.4:863-864 Ap '62. (MIRA 15:6)

1. Leningradskiy universitet imeni A.A.Zhdanova.
(Sorption) (Photochemistry) (Zinc oxide)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

S/020/62/143/005/016/018
B101/B110

AUTHORS: Rapoport, V. L., and Solonitsyn, Yu. P.

TITLE: Photosorption of hydrogen on titanium dioxide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 5, 1962, 1149-1151

TEXT: Photosorption of H_2 on TiO_2 was studied by means of an apparatus described earlier (ZhFKh, 32, 2142 (1958)), in which the Hg seal was replaced by a brass valve with fluoroplast packing. The pressure drop of H_2 which had been conducted into the vessel containing the sample (initial P_{H_2} about $6.4 \cdot 10^{-5}$ mm Hg) was measured. Powdered samples of TiO_2 were studied (a) untreated; (b) annealed at 350°C in 0.5 atm O_2; subsequently, O_2 was again removed by heating at 350-400°C in the vacuum; (c) only annealed in O_2. Only samples (c) showed photosorption

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Photosorption of hydrogen on ...

of H_2. The electric resistance prior to annealing in O_2 was $3 \cdot 10^5$ ohms, after annealing $4 \cdot 10^7$ ohms. No photoconductivity was observed. The resistance of the sample did not change when H_2 was introduced into the vessel. The p_{H_2} drops rapidly and irreversibly as soon as the sample is illuminated (Hg lamp or powerful monochromator) and gradually (after about 20 min) approaches a limiting value (about $3.2 \cdot 10^{-5}$ mm Hg). Evacuation at room temperature and introduction of another portion of H_2 did not lead to a regeneration of photosorption which, however, was brought about by a short heating of the sample to 400°C. In this connection no gases were released. The following possibilities are assumed: (1) the adsorbed H_2 migrates from the illuminated active centers to the non-illuminated ones; (2) H_2 diffuses into the TiO_2 lattice; (3) H_2 reacts with TiO_2 under formation of H_2O whose small amounts cannot be detected. The degree of saturation of the monolayer with H_2 was only 0.001-0.01 so that it was uncertain whether H_2 sorption

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Photosorption of hydrogen on ... S/020/62/143/005/016/018
B101/B110

Hg lamp as well as with incandescent lamp. There are 2 figures.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

PRESENTED: November 16, 1961, by A. N. Terenin, Academician

SUBMITTED: October 20, 1961

Card 4/4

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 52348-65

ACCESSION NR: AP5011682

UR/0195/65/006/002/0250/0257

AUTHOR: Solonitsyn, Yu. P.

TITLE: Photodesorption and photosorption of oxygen on zinc oxide. Conditions of observation and photosorptive properties of muffle zinc oxide

SOURCE: Kinetika i kataliz, v. 6, no. 2, 1965, 250-257

TOPIC TAGS: zinc oxide, oxygen, photosorption, photodesorption

ABSTRACT: The present work is the first in a series on the photosorptive properties of zinc oxide, with the basic object of research being commercial muffle zinc oxide. It is shown that only oxygen photosorption is observed on zinc oxide thoroughly purified by heating in oxygen. Conditions are determined for repeated photosorption after saturation (brief heating in vacuum or in oxygen at 350-400°) and the spectral characteristics in the visible and near ultraviolet regions of the spectrum are found. Using muffle zinc oxide as an example, it is shown that the quantity of photosorbed oxygen in the 1×10^{-3} - 1×10^{-2} mm Hg pressure range is independent of pressure and is uniquely determined by exposure. This is explained by assuming that

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L 52348-65

ACCESSION NR: AP5011682

illumination creates or activates oxygen photosorption centers with comparatively long lives. Experiments showed that the photosorption rate in the case of fixed exposure time depends on light intensity; however, this holds true only to a point, as in the case of very great intensity the sample is heated by the light, which reduces the photosorption rate. Comparatively long-lived oxygen photosorption centers can be created or activated on zinc oxide by illuminating the sample before oxygen intake. Experiments showed that photosorptive oxygen could not be removed from the zinc oxide surface without initiation of photosorptive activity. From this and other facts it is concluded that separation of photosorptive oxygen during heating is a secondary process and occurs as a result of the deactivation of the photosorptive centers. "The work was done under the direction of Academician A. N. Terenin." Orig. art. has: 6 figures, 1 formula.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 14Jun63 ENCL: 00 SUB CODE: GC, OP

NO REF SOV: 005 OTHER: 007

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 59532-65 EWG(j)/EWT(m)/EWP(w)/EPF(c)/EWA(d)/EPR/T/EWP(t)/EWP(b) Pr-4/Ps-4
IJP(c) JD

ACCESSION NR: AP5016811 UR/0195/65/006/003/0433/0438
548.47-31.097.312.6+
541.183 : 546.21

35
34
B

AUTHOR: Solonitsyn, Yu. P.

TITLE: Effect of absorbed oxygen on the temperature dependence of zinc oxide conductivity

SOURCE: Kinetika i kataliz, v. 6, no. 3, 1965, 433-438

TOPIC TAGS: adsorption, oxygen, conductivity, zinc oxide

ABSTRACT: Effect of adsorbed oxygen on the temperature dependence of zinc oxide conductivity was studied using a PSI-02 millivoltometer. The experimental technique was based on simultaneous measurement of conductivity of zinc oxide and oxygen pressure in a closed system during heating at a constant rate of temperature increase. The experimental set-up allowed variations of the conductivity from 10^{-2} to 10^{-11} ohm^{-1} and oxygen pressure from 10^{-5} to 10^{-2} mm Hg. Samples were calcined at 500°C under a vacuum of 10^{-5} mm Hg. Maximum O_2 pressure coincides with minimum conductivity at about 200°C when zinc oxide is gradually heated from room temperature to

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L 59532-65
ACCESSION NR: AP5016811

300°C. This anomalous drop in conductivity is due to partial desorption of oxygen. Oxygen adsorbed on zinc oxide may exist in various forms according to the diagram in fig. 1 of the Enclosure, where *A* is energy of oxygen from transition in kcal/mol, and *n* is number of electrons localized during adsorption of one molecule of oxygen. The very small effect of adsorbed oxygen on conductivity at higher temperatures is due to gradual consumption of adsorbed oxygen in oxidation of organic impurities. Orig. art. has: 4 figures, 6 formulas.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 11Jul63 ENCL: 01 SUB CODE: GC

NO REF SOV: 005 OTHER: 008

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L 59332-65

ACCESSION NR: AP5016011

ENCLOSURE: 01

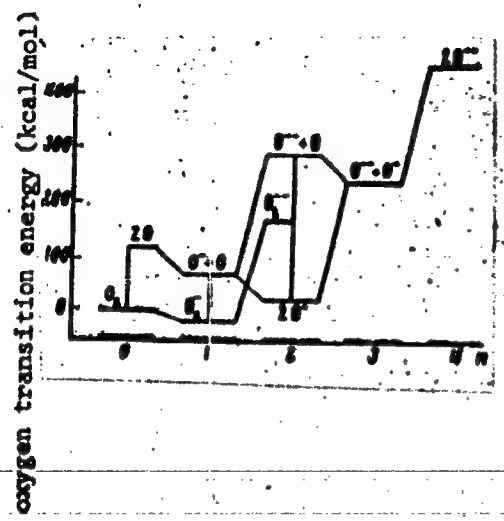

Fig. 1. Possible forms of oxygen adsorption.

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

BASOV, L.L.; SOLONITSYN, Yu.P.

Photodesorption and photosorption of oxygen on zinc oxide. Kin. i kat. 6 no.4:752-754 Jl-Ag '65. (MIRA 18:9)

1. Leningradskiy gosudarstvennyy universitet imeni A.A.Zhdanova.

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L 2685-66 EPF(c)/EWT(m)/EWP(i)/T/EWP(t)/EWP(b) IJP(c) DS/JD

ACCESSION NR: AP5023368 UR/0020/65/164/001/0122/0124

38
AUTHORS: Basov, L. L.; Solonitsyn, Yu. P.; Terenin, A. N. (Academician) 37
B

TITLE: Influence of illumination on the adsorption ability of certain oxides 27

SOURCE: AN SSSR. Doklady, v. 164, no. 1, 1965, 122-124

TOPIC TAGS: photocell, photosorption, semiconductor, metal oxide, oxygen, hydrogen, methane

ABSTRACT: The photosorptive properties of thirty different oxide films were investigated. The aim of the investigation was to extend the data on the effect of light irradiation on the photosorptive properties of a number of oxides reported by V. L. Rapoport (DAN, 153, 871, 1963). The experimental procedure followed was that of Yu. P. Solonitsyn (Kinetika i kataliz, 6, No. 2, 1965). The photosorption ability was determined by measuring the sorption of oxygen, hydrogen, and methane gases. The results are presented in tabular form. It was found that for most oxides photosorption occurs only if irradiated with light of a wavelength shorter than 330 mμ. It is noted that photosorption is a more common phenomenon than photoconduction. Orig. art. has: 1 table.

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 2685-66

ACCESSION NR: AP5023368

ASSOCIATION: Leningradskiy gosudartvennyy universitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 05Apr65 ENCL: 00 SUB CODE: OC,OP

NO REF SOV: 008 OTHER: 006

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 29542-66 EWT(m)/T

ACC NR: AP6007775 SOURCE CODE: UR/0195/66/007/001/0128/0135

48
46
8

AUTHOR: Solonitsyn, Yu. P.

ORG: Leningrad State University im. A. A. Zhdanov (Leningradskiy gosudarstvennyy universitet)

TITLE: Photodesorption and photosorption of oxygen on zinc oxide. Comparison with photoconductivity

SOURCE: Kinetika i kataliz, v. 7, no. 1, 1966, 128-135

TOPIC TAGS: oxygen, sorption, desorption, photoconductivity, zinc oxide

ABSTRACT: The study was carried out in order to make a detailed qualitative comparison of photosorptive and photoelectric (photoconductive) properties of zinc oxide measured simultaneously. Simultaneous measurements of conductivity and oxygen pressure showed that the change of conductivity during illumination has the same qualitative character both in photodesorption and photosorption of oxygen. It was found that an increase in the concentration of free electrons participating in the conduction during illumination cannot be the main cause of the photosorption of

Card 1/2 UDC: 541.145 : 541.183.26 : 546.47-31

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

ACCESSION NR: AP4042864 S/0114/64/000/007/0038/0041

AUTHOR: Preobrazhenskiy, V. P. (Candidate of technical sciences); Buvin, N. P. (Candidate of technical sciences); Pinskiy, F. I. (Engineer); Solon'ko, L. G. (Engineer); Chistyakov, V. S. (Engineer)

TITLE: Measuring temperatures of a pulsating gas stream

SOURCE: Energomashinostroyeniye, no. 7, 1964, 38-41

TOPIC TAGS: gas stream, pulsating gas stream, pulsating gas stream temperature, diesel engine

ABSTRACT: A method for measuring variable temperatures by a low-inertia temperature sensor (resistance thermometer) whose readings are interpreted by a computer on the basis of known dynamic characteristics of the sensor is offered. The temperature of the sensor is connected with that of the gas stream by this equation: $T\frac{dt_t}{d\tau}+t_t=t_n$. where t_n and t_t are the temperatures of the gas stream and the sensor, respectively, T is the sensor time constant, and τ is time. The method was used at Kolomna Diesel-Locomotive-Building Plant for

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLON'KO, P.T., inzh.

Burners for the steam generators of ZK-0,5 and ZK-0,1 feed steam plants. Mekh. sil'. hosp. 13 no.8:29-30 Ag '62. (MIRA 15:7)
(Feeding and feeding stuffs)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLON'KO, P.T., inzh.

Controlling the quality of welding joints by using a magnetic flaw detector. Mekh.sil'.hosp. 13 no.12:9 D '62. (MIRA 16:2)
(Agricultural machinery—Maintenance and repair)
(Welding) (Magnetic testing)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLON'KO, P.T., inzh.

A manual for locksmiths and repairmen. Mekh. sil'. hosp. 13 no.4:31 Ap '52. (MIRA 17:3)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SMETANA, L.M.; SOLON'KO, V.M.

Outlook for the reduction of the size of bandages. Report No.2. Farmatsev. zhur. 16 no.1:59-63 '61. (MIRA 17:8)

1. Khar'kovskiy farmatsevticheskiy institut.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

KRASOVSKIY, I.V. [Krasovs'kyi, I.V.]; CHIZHIKOVA, G.P. [Chyzhykova, H.P.]; SALO, D.P.; SOLON'KO, V.M.

Study of the deviation of some physical properties of binary nonelectrolyte solutions from the additive pattern and an analysis of these solutions based on the refraction and density index. Farmatsev. zhur. 15 no.6:10-18 '60. (MIRA 14:11)

1. Kafedra fizicheskoy khimii Khar'kovskogo farmatsevticheskogo instituta, zaveduyushchiy kafedroy dotsent I.V.Krasovskiy [Krasovs'kyi, I.V.].
(SOLUTIONS (PHARMACY)) (ELECTROLYTE SOLUTIONS)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1560
AUTHOR ŠINJANSKIJ,L.A., SOLON'KO,V.N.
TITLE The Absorption of Ultrasonic Oscillations as a Characteristic of the Elastic Properties of Rubber.
PERIODICAL Zurn.techn.fis, 26, fasc.10, 2302-2302 (1956)
Issued: 11 / 1956

In the present work previous investigations of this dependence (L.A.ŠINJANSKIJ, Žurn.techn.fis, 24, 851 (1954)) were continued up to the point of the breaking of the samples. Measurings were carried out at room temperatures and at 2500 kc. Several mixtures which had been produced by various kinds of vulcanization processes were examined.
The characteristic properties of rubber are satisfactorily explained if the conception of flexible chainlike molecules, which are formed by the transversal connections of a spatial lattice is taken as a basis. The individual parts (segments) of the molecular chains of the not deformed rubber are irregularly orientated. In literature these parts are considered as mechanical "dipoles" which endeavor to orientate themselves in the direction of the exterior deforming forces. Herefrom the conclusion is drawn that the deformation of rubber may be looked upon as a "phenomenon of mechanical polarization".
In the case of a onedimensional extension, a deformation law is derived which agrees with experimental data within the total domain of extension until breakage occurs. "Mechanical polarization" is accompanied by a modification of the order of molecular chains, and these modifications increase the absorption

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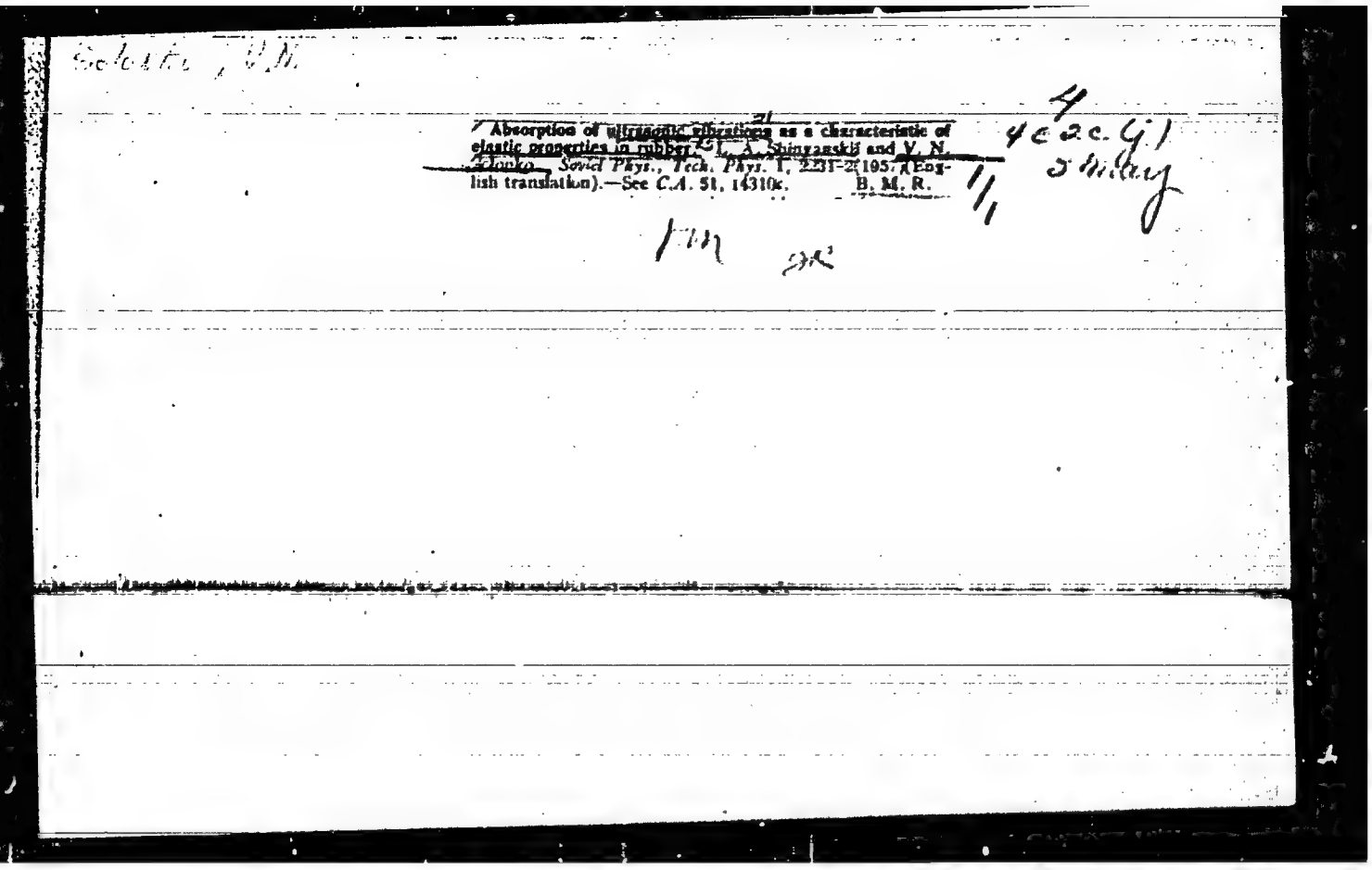

Absorption of ultrasonic vibrations as a characteristic of elastic properties in rubber. L. A. Shinyanskii and V. N. Solodkin. *Soviet Phys., Tech. Phys.* 1, 2231-2 (1957) (English translation).—See *C.A.* 51, 14310c. B. M. R.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

ZIKOVA, N.Ya. [Zykova, N.IA.]; KAZARNOVSKIY, L.S. [Kazarnovs'kyi, L.S.]; SOLON'KO. V.N.; SHINYANSKIY, L.A. [hynians'kyi, L.A.]

Preparing extracts with the use of ultrasonic waves. Farmatsev. zhur. 16 no.4:15-16 '61. (MIRA 17:6)

1. Khar'kovskiy farmatsevticheskiy institut.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 55914-65
ACCESSION NR: AP5018321

UR/0243/64/000/008/0029/0030

AUTHOR: Kazarnovskiy, L. S.; Solon'ko, V. N.; Shinyanskiy, L. A.

TITLE: Derivation of adrenalin from the suprarenals by the action of ultrasound

SOURCE: Meditsinskaya promyshlennost' SSSR, no. 8, 1964, 29-30

TOPIC TAGS: biologic secretion, gland, gland drug, ultrasonic vibration

ABSTRACT: The method of the derivation of adrenalin from the adrenal glands of cattle by the application of ultrasound is described in the article. The adrenals of cattle were reduced to fine particle in a meat grinder and then covered with 96 percent alcohol in a ratio of 1:2. The mixture poured into a glass container was then placed in an ultrasound bath filled with oil which was cooled by running water. Ultrasound was applied at a frequency of 500 kilocycles and an intensity of nine volts per square centimeter for a period of 10 minutes. The liquid was then

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L 55914-65
ACCESSION NR: AP5018321

decanted and the oil-cake that was left was covered with 65 percent alcohol in a ratio of 1:1.5. Complete extraction of the adrenalin took place when the adrenals were treated with ultrasound a second time for five minutes. The proteins and mucous substances in the extract were precipitated by acetone, fatty substances removed from the residue by petroleum ether. After draining off the ether, the residue was treated with dichloroethane; the aqueous part was filtered with ammonium added to the filtrate. Fine crystals of adrenalin were obtained. Tests established the purity of the preparation.

ASSOCIATION: Khar'kovskiy farmatsevticheskiy institut (Kharkov Institute of Pharmacy)

SUBMITTED: 13Apr64 ENCL: 00 SUB CODE: LS

NR REF SOV: 001 OTHER: 000 JPRS

Card 2/2

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

LUTSKIY, A.Ye.; SOLON'KO, V.N.

Hydrogen bonding and the specific heat of liquids. Ukr. fiz. zhur. 9 no.4:459-463 Ap '64. (MIRA 17:8)

1. Khar'kovskiy politekhnicheskiy institut.

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

L 02237-67 EWT(1)/EWT(m)/EWP(j)/T/EWP(k) RM

ACC NR: AR6013711 SOURCE CODE: UR/0058/65/000/010/H074/H074

AUTHOR: Lutskiy, A. Ye.; Solon'ko, V. N.; Goncharova, Ye. I.

TITLE: The hydrogen bond and the rate of propagation of ultrasound in "non-simple" liquids

SOURCE: Ref. zh. Fizika, Abs. 10Zh494

REF SOURCE: Sb. Primeneniye ul'traakust. k issled. veshchestva. Vyp. 20, M., 1964, 29-36

TOPIC TAGS: hydrogen bonding, ultrasonic wave propagation, liquid property, amine, primary aromatic amine

ABSTRACT: Results are presented of measurements of the speed of ultrasound in five liquid amines over a wide range of temperatures. It is shown that there is no stretching with respect to the hydrogen bonds in the liquid state in either alicyclic or fatty amines. A noticeably smaller ordering of the structure of the liquid, and consequently a smaller reduction in its free volume than in the case of aromatic amines, takes place upon formation of complexes of molecules as a result of the hydrogen bonds in heterocyclic compounds with the N-H group. Ye. Sheludyankov. [Translation of abstract]

SUB CODE: 07

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

ACCESSION NR: AP4019523

(C) in liquids and a noticeable decrease in its thermal coefficient ($\Delta C/\Delta T$). This effect of complex formation can be observed both with the chain association of the monoatomic phenols and (to a somewhat greater degree) in a spatially branched network of diatomic phenols. A linear change in C with temperature in complex-forming substances assumes the absence of noticeable destruction of complexes in the liquid phase. The application of the Rao rule does not disclose the presence of complex formation and its specific influence on C. The same applies to the comparison of the C values at the same "reduced" temperature in corresponding states. Orig. art. has: 2 figures, 00 formulas, 5 tables.

ASSOCIATION: Politekhnicheskiy institut (Polytechnical Institute)

SUBMITTED: 06Mar63 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: CH NO REF SOV: 011 OTHER: 010

Card 2/2

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

LUTSKIY, A.Ye.; SOLON'KO, V.N.

Certain regularities in the propagation rate of ultrasonic waves in liquids. Zhur. fiz. khim. 38 no.5:1091-1096 My '64.

Hydrogen bonding and compressibility of liquids. Part 1. Ibid.:1097-1102 (MIRA 18:12)

1. Khar'kovskiy politekhnicheskiy institut. Submitted Dec. 31, 1962.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

[illegible]SKIY, A.Ye.; SOLOH'KO, V.N.

Hydrogen bonding and compressibility of liquids. Part 2.
Zhur. fiz. khim. 38 no.6:1421-1428 Je '64.
(MIRA 18:3)

1. Khar'kovskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

LUTSKIY, A.Ye.; SOLOV'KO, V.N.

Hydrogen bonding and propagation rate of ultrasonic waves in liquids. Part 2. Zhur. fiz. khim. 39 no.3:783-787 Mr '65. (MIRA 18:7)

1. Khar'kovskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

20-119-3-14/65

AUTHOR: Solonnikov, V.

TITLE: On Linear Differential Equations With a Small Parameter in the Highest Derivatives (O lineynykh differentsial'nykh uravneniyakh s malym parametrom pri starshikh proizvodnykh)

PERIODICAL: Doklady Akademii Nauk, 1958, Vol 119, Nr 3, pp 454-457 (USSR)

ABSTRACT: Let u_ε be the solution of a linear partial differential equation the highest derivatives of which have ε as coefficient. For a series of linear problems the author shows that with $\varepsilon \to 0$ the solution u_ε tends to a certain solution u of the degenerated equation ($\varepsilon = 0$). For this purpose he only applies certain new integral estimations and proves the solvability of the degenerated equation by the limit passage $\varepsilon \to 0$. The consideration is divided into two steps: 1.) A priori estimations are obtained which allow to show that it is possible to separate from $\{u_\varepsilon\}$ a subsequence convergent to a function u, whereby u can be considered as a generalized solution of the degenerated problem. 2.) Proof of the uniqueness from which it follows the convergence of the total sequence $\{u_\varepsilon\}$ to u. The author's considerations seem to be

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On Linear Differential Equations With a Small Parameter in the Highest Derivatives 20-119-3-14/65

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which are Soviet and 2 American.

PRESENTED: November 1, 1957, by V.I. Smirnov, Academician

SUBMITTED: October 24, 1957

Card 2/2

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

10(2)

AUTHORS: Ladyzhenskaya,O.A. and Solonnikov,V.A. SOV/20-124-1-5/69

TITLE: On the Solvability of Non-stationary Problems of Magnetic Hydrodynamics (O razreshimosti nestatsionarnykh zadach magnitnoy gidrodinamiki)

PERIODICAL: Doklady Akademii nauk SSSR,1959,Vol 124,Nr 1,pp 26-28(USSR)

ABSTRACT: The authors consider a viscous incompressible liquid in a magnetic field. For the determination of the velocity, pressure, electric and magnetic potential they use the original enlarged Maxwell system of equations with the initial conditions $v(0) = v_0$, $H(0) = H_0$ and with different boundary conditions. Three boundary value problems are formulated and their solvability in the large is proved under relatively weak conditions. The final results are about the same as for the Navier-Stokes equations in [Ref 1]. The authors propose a scheme for the solution of the problems. There is 1 Soviet reference.

ASSOCIATION: Leningradskoye otdeleniye matematicheskogo instituta imeni V.A.Steklova AN SSSR (Leningrad Section of the Mathematical Institute imeni V.A. Steklov AS USSR)

Card 1/2

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

On the Solvability of Non-stationary Problems of Magnetic Hydrodynamics SOV/20-124-1-5/6

PRESENTED: August 11, 1958, by V.I. Smirnov, Academician

SUBMITTED: August 8, 1958

Card 2/2

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2"

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

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C111/C333

16 3500 24.2300

AUTHORS: Ladyzhenskaya, O. A., Solonnikov, V. A.

TITLE: The solution of some instationary problems of magnetohydrodynamics for a viscous incompressible fluid

PERIODICAL: Referativnyy zhurnal, Matematika, no. 12, 1961, 41, abstract 12B180. ("Tr. Matem. in-ta. AN SSSR", 1960, 59, 115-173)

TEXT: The authors investigate the instationary equations of magnetohydrodynamics of a viscous incompressible conducting, homogeneous, isotropic fluid. The following physical systems are considered:

1. Fluid and field are in the bounded domain Ω which is separated from the other space by an ideal conductor.

2. There are domains: Ω_1 filled with fluid; Ω_3 filled with a rigid conductor through which given currents are flowing; Ω_2 enclosing Ω_1 and Ω_3 which is filled with a dielectric. The domain $\Omega = \Omega_1 \cup \Omega_2 \cup \Omega_3$ is separated from the other space by an ideal conductor.

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The solution of some instationary . . .

3. The total space, except the domain Ω, is filled with a dielectric. A given electromagnetic field is maintained at infinity. A conducting fluid moves in the interior of Ω.

The cases of two and three spatial variables are separately considered in all problems. In order to investigate these problems the authors pass over from the classical formulation to a generalized one in which the initial equations are changed into a system of integral identities, which must be satisfied by the generalized solutions. The results obtained by the authors relative to the existence and uniqueness of the generalized solutions are analogous to those obtained by A.A. Kiselev and O. A. Ladyzhenskaya (R Zh Mat, 1958, 6726) as well as of O. A. Ladyzhenskaya (R Zh Mat, 1960, 1881) for "usual" hydrodynamics of viscous fluids. Namely, the unique solvability "in the large" relative to the time is stated for plane problems. For spatial problems the unique solvability "in the large" is proved under the assumption that the given currents and initial velocities are small in a certain sense. Without this condition the existence of a unique solution is proved only for a certain time interval $[0, T]$, where T is estimated from below.

[Abstracter's note: Complete translation.]

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

25613
S/517/60/059/000/006/006
B112/B202

1.3500

AUTHOR: Solonnikov, V. A.

TITLE: Certain stationary boundary value problems of magnetohydrodynamics

PERIODICAL: Akademiya nauk SSSR. Matematicheskiy institut. Trudy, v. 59, 1960, 174 - 187

TEXT: The author bases his magnetohydrodynamic studies on the following set of equations:

$$-\nu\Delta\vec{v} + v_x\partial\vec{v}/\partial x_k - \frac{\mu}{\rho}H_k\partial\vec{H}/\partial x_k = -\frac{1}{\rho}\operatorname{grad}(p + \mu H^2/2) + \vec{f}, \quad (1)$$

$$\operatorname{div}\vec{v} = 0, \quad (2)$$

$$\operatorname{curl}\vec{H} = \sigma(\vec{E} + \mu[\vec{v},\vec{H}]) + \vec{j}_0, \quad \operatorname{curl}\vec{E} = 0, \quad \operatorname{div}\mu\vec{H} = 0 \quad (3), (4), (5)$$

The flowing fluid fills a space Ω_1, a conductor with given current distribution a space Ω_3, a dielectric fills the remaining space Ω_2. The author formulates classical and generalized boundary conditions

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

68600

S/020/60/130/05/009/061

16(1) 163500

AUTHOR: Solonn'kov, V.

TITLE: Evaluations of Green Tensors for Some Boundary Value Problems

PERIODICAL: Doklady Akademii nauk SSSR,1960,Vol 130,Nr 5,pp 988-991 (USSR)

ABSTRACT: 1. The author considers first boundary value problem for the stationary Navier-Stokes system

(1) $\Delta \vec{v} = \operatorname{grad} p + \vec{f}$, $\operatorname{div} \vec{v} = 0$, $\vec{v}|_S = 0$

in the bounded three-dimensional domain Ω with the boundary S. For the Green tensor of the problem (1) constructed by Odquist [Ref 1] the author gives estimations which generalize the results of Odquist [Ref 1]. He shows that from $S \in C^2$ it follows $\| \vec{v} \|_{W_p^2(\Omega)} \leq c \| f \|_{L_p(\Omega)}$.

2. The author considers the problems

(2) $\operatorname{rot} \vec{H} = \vec{j}$, $\operatorname{div} \vec{H} = 0$, $H_n|_S = 0$

(3) $\operatorname{rot} \vec{E} = \vec{a}$, $\operatorname{div} \vec{E} = 0$, $\vec{E}_\tau|_S = 0$

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88209

S/020/60/134/002/034/041XX
C 111/ C 333

16.4600

AUTHOR: Solonnikov, V. A.

TITLE: Certain Properties of Factional Order $\mathfrak{W}_p^\ell$ Spaces

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 2, pp. 282-285

TEXT: The space $\mathfrak{W}_p^\ell(E_n)$ is defined as the closure of the finite smooth functions in E_n with respect to the norm

$\|f\|_{\mathfrak{W}_p^l(E_n)}$, where

$$\|f\|_{\mathfrak{W}_p^l(E_n)} = \sum_{i,j=1}^{n} \left(\int_0^\infty \frac{dh}{h^{1+p\lambda}} \int_{E_n} \left| D_i^{\bar{l}} f(x_1 \dots x_j+h \dots x_n) + \right.\right.$$

$$\left.\left. + D_i^{\bar{l}} f(x_1 \dots x_j-h \dots x_n) - 2 D_i^{\bar{l}} f(x_1 \dots x_n) \right|^p dx \right)^{1/p}$$

and $l = \bar{l} + \lambda$, $0 < \lambda \leq 1$, $D_i^{\bar{l}} = \frac{\partial^{\bar{l}}}{\partial x_i^{\bar{l}}}$

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

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C 111/ C 333

Certain Properties of Fractional Order $\mathfrak{M}_p^{\ell}$ Spaces

The author wishes to show that a number of well-known and some new facts concerning $f \in \mathfrak{M}_p^{\ell}(E_n)$ can be proved in a very distinct and simple way with the aid of the representation

$$(1)\quad f(x) = \frac{1}{h}\int_x^{x+h} f(\xi)\,d\xi - \int_x^{x+h} \frac{dt}{(t-x)^2} \int_x^t [\,f(t) - f(\xi)\,]\,d\xi$$

due to V. P. Jl'in (Ref.8).

The author formulates six theorems, e. g.

Theorem 3: If $f \in \mathfrak{M}_p^{\ell}(E_n)$, $l_1 < 1$, then $f \in \mathfrak{M}_{p_1}^{\ell_1}(E_n)$, where

$$1 - \frac{n}{p} = l_1 - \frac{n}{p_1}, \qquad \| f \|_{\mathfrak{M}_{p_1}^{\ell_1}} \leqq C \| f \|_{\mathfrak{M}_p^{\ell}}$$

Theorem 4: If $f \in \mathfrak{M}_p^{\ell}(E_n)$, $lp < n$, then $f \in L_q(E_n)$, where

Card 2/3

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLONNIKOV, V. A. Cand Phys-Math Sci -- "On one class of functional spaces and on the a-priori estimations for solutions of certain boundary-value problems of mathematical physics." Len, 1961 (Len Order of Lenin State Univ im A. A. Zhdanov). (KL, 4-61, 185)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

S/124/62/000/005/006/048
D251/D308

AUTHOR: Solonnikov, V.

TITLE: Some stationary problems for the equations of magnetic hydrodynamics of a viscous incompressible liquid

PERIODICAL: Referativnyy zhurnal. Mekhanika, no. 5, 1962, 7 - 8, abstract 5B37 (V sb. Funktsional'n, analiz i yego primeneniye, Baku, AN AzerbSSR, 1961, 241)

TEXT: A brief annotation of the paper. The equations of magnetic hydrodynamics are considered for the stationary flow of a viscous incompressible fluid of finite conductivity in a bounded region. The electromagnetic processes in the external medium are computed, and in its dielectric regions is calculated the density of the charges. Some boundary value problems are formulated, for which are considered the existence of generalized equations, their differential properties and the connection with the classical equations. [Abstractor's note: Complete translation].

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLONNIKOV, V.A.

A priori estimates for certain boundary value problems. Dokl.AN SSSR no.4:781-784 '61. (MIRA 14:5)

1. Predstavleno akademikom V.I.Smirnovym.
(Boundary value problems)
(Spaces, Generalized)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

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C 111/ C 333

16.3400

AUTHORS: Il'in, V. P., Solonnikov, V. A.

TITLE: Some Properties of Differentiable Functions of Many Variables

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 3, pp. 538-541

TEXT: The authors consider functions which possess various differential properties in several variables (see (Ref.1-4)).

Let $f(x_1, \ldots, x_n)$ be a smooth function; $h>0$, $\alpha_i > 0$ $(i=1,2,\ldots,n)$ arbitrary constants; ν_i, l_i, s_i, k_i arbitrary nonnegative integers, $0 \leq \nu_i \leq l_i$. It holds the identity:

$$D_{x_1}^{\nu_1} D_{x_2}^{\nu_2} \ldots D_{x_n}^{\nu_n} f(x) = \frac{C}{h^r} \int_0^{h^{\alpha_1}} \cdots \int_0^{h^{\alpha_n}} f(x_1 + y_1, \ldots, x_n + y_n) \times$$

$$\times \prod_{l=1}^{n} \frac{\partial^{l_l}}{\partial y_l^{l_l}} \left[\frac{y_l^{l_l - \nu_l - 1}}{(l_l - \nu_l - 1)!} \Psi_l(y_l, h^{s_l}) \right] dy_1 \ldots dy_n -$$

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

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C 111/ C 333

Some Properties of Differentiable Functions of Many Variables

$$-C\sum_{l=1}^{n}\varkappa_l\int_0^h\frac{dv}{v^{1+r}}\int_0^{v^{\varkappa_1}}\dots\int_0^{v^{\varkappa_n}}\prod_{l+l}\frac{\partial^{\bar\gamma_l}}{\partial y_l^{\bar\gamma_l}}\left[\frac{y_l^{\bar\gamma_l-\nu_l-1}}{(\bar\gamma_l-\nu_l-1)!}\psi_l(y_l,v^{\varkappa_l})\right]dy_1\dots dy_n\times$$

$$\times\int_0^{v^{\varkappa_l}-y_l}\Big[D_l^{\bar\gamma_l}f(x_1+y_1,\dots,x_l+y_l+t,\dots,x_n+y_n)-$$

$$-2D_l^{\bar\gamma_l}f(x_1+y_1,\dots,x_l+y_l+t/2,\dots,x_n+y_n)+$$

$$+D_l^{\bar\gamma_l}f(x_1+y_1,\dots,x_l+y_l,\dots,x_n+y_n)\Big]\Big[\gamma_{1l}y_l^{\bar\gamma_l+k_l}\left(v^{\varkappa_l}-y_l-t\right)^{\bar\gamma_l+\nu_l+\varkappa_l}+$$

$$+\gamma_{2l}y_l^{\bar\gamma_l+k_l+1}\left(v^{\varkappa_l}-y_l-t\right)^{\bar\gamma_l+\nu_l}\Big]dt,$$

where C, γ_{1l}, γ_{2l} are certain constants, $r=\sum_{l=1}^{n}\varkappa_l(\bar\gamma_l+\nu_l+k_l+3)$,

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Some Properties of Differentiable Functions of Many Variables

$$\psi_l(y_l),\ v^{\varkappa_l} = (\bar{l}_l - \nu_l)\int_{y_l}^{v^{\varkappa_l}} (v^{\varkappa_l} - t)^{\bar{l}_l+\varkappa_l+s_l} t^{k_l+\nu_l}\,dt +$$

$$+ 2y_l \frac{\partial}{\partial y_l}\int_{y_l}^{v^{\varkappa_l}} (v^{\varkappa_l} - t)^{\bar{l}_l+\varkappa_l+s_l} t^{k_l+\nu_l}\,dt +$$

$$+ \frac{1}{\bar{l}_l - \nu_l - 1} y_l^2 \frac{\partial^2}{\partial y_l^2}\int_{y_l}^{v^{\varkappa_l}} (v^{\varkappa_l} - t)^{\bar{l}_l+\varkappa_l+s_l} t^{k_l+\nu_l}\,dt.$$

Most of the results formulated below follow from the given identity.

Let D be a domain of the E_n with the property: In every point $x \in \bar{D}$ an n-dimensional rectangle can be constructed lying entirely in $\bar{D}$, the corner of which is in x, and the edges of which are parallel to the axes of coordinates and have the constant length $\mathcal{L}_i$ (i=1,2,..,n). Moreover: If $(x_1, \ldots, x_i, \ldots, x_n)$ and $(x_1, \ldots, x_i+t_i, \ldots, x_n)$

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Some Properties of Differentiable Functions of Many Variables

belong to D, then also $(x_1, \ldots, x_i + \vartheta t_i, \ldots, x_n) \in D$, $0 \leqq \vartheta \leqq 1$, $t_i \leqq \mathfrak{Re}_i$. Let

$\mathring{W}^{l_1 \ldots l_n}_{p_0, p_1 \ldots p_n}(D)$ be the space of functions

which is the closure of the set of smooth functions in the norm

$$\|f\|_{\mathring{W}^{l_1 \ldots l_n}_{p_0, p_1 \ldots p_n}(D)} = \|f\|_{L_{p_0}(D)} + \|f\|_{L^{l_1 \ldots l_n}_{p_1 \ldots p_n}(D)}$$

where

$$\|f\|_{L^{l_1, \ldots l_n}_{p_1, \ldots p_n}(D)} = \sum_{l=1}^{n} \left[\int_D dx_1 \ldots dx_n \int_{l_l(x)} \left| D_l^{l_l} f(x_1, \ldots, x_l + t, \ldots, x_n) - 2D_l^{l_l} f\left(x_1, \ldots, x_l + \frac{t}{2}, \ldots, x_n\right) + D_l^{l_l} f(x) \right|^{p_l} \frac{dt}{t^{1+p_l \lambda_l}} \right]^{1/p_l}.$$

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$I_i(x)$ is the set of the t-values, for which $(x_1, \ldots, x_i+t, \ldots, x_n) \in D$, if $(x_1, \ldots, x_i, \ldots, x_n) \in D$; $p_i > 1$; $l_i = \overline{l}_i + \lambda_i$, where $\overline{l}_i$ is a nonnegative integer, $0 < \lambda_i \leq 1$.

Theorem 1: Let D be bounded and star-shaped relative to a certain point. If $f(x) \in L_p(D)$ possesses generalized derivatives of the order l_i with respect to x_i,

$$\|f\|_{\mathcal{B}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}(D)} < \infty, \text{ then } f \in \mathcal{W}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}(D),$$

i.e. f(x) can be approximated by smooth functions in the norm of

$$\mathcal{W}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}(D).$$

Theorem 2: If D is a finite or infinite rectangle, the edges of which are parallel to the axes, then

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$f \in \mathfrak{W}_{p_0 p_1 \cdots p_n}^{l_1 \cdots l_n}$ can be continued, under remaining differential properties and norm, on the entire E_n (in the sense of the norm equivalence).

Let $\varkappa_i \equiv \frac{1}{l_i}\left(1 - \sum_{j=1}^{n} \frac{1}{p_j l_j} + \frac{1}{p_i} \sum_{j=1}^{n} \frac{1}{l_j}\right) > 0.$

Theorem 3: Let $f \in \mathfrak{W}_{p_0 p_1 \cdots p_n}^{l_1 \cdots l_n}$ (D). Then it holds:

1.) If $\varepsilon_0 = 1 - \sum_{i=1}^{n} \frac{1}{p_i l_i} - \sum_{i=1}^{n} \varkappa_i \vartheta_i > 0$, then f(x) is equivalent to a continuous function differentiable in $\overline{D}$ and

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$$\left|D^{\nu_1}_{x_1} D^{\nu_2}_{x_2} \dots D^{\nu_n}_{x_n} f\right| \leq C \left(\|f\|_{L_{p_0}(D)} h^{-\frac{1}{p_0}\sum_{i=1}^{n}\alpha_i - \sum_{i=1}^{n}\alpha_i\nu_i} + \right.$$

$$\left. + \|f\|_{L_{p_1 \dots p_n}^{l_1 \dots l_n}(D)} h^{\varepsilon_s} \right).$$

2.) If $\varepsilon_s = 1 - \sum_{j=1}^{n} \frac{1}{p_j l_j} - \sum_{j=1}^{n} \alpha_j \nu_j + \frac{1}{q} \sum_{j=1}^{s} \alpha_j > 0$, $q \geq p_i > 1$

$(i = 0, 1, \dots n)$

then

$$|D^{\nu_1}_{x_1} D^{\nu_2}_{x_2} \dots D^{\nu_n}_{x_n} f|_{L_q(D_1)} < C \left(\|f\|_{L_{p_0}(D)} h^{\frac{1}{q}\sum_{j=1}^{s}\alpha_j - \frac{1}{p_0}\sum_{j=1}^{n}\alpha_j - \sum_{j=1}^{n}\alpha_j\nu_j} + \right.$$

$$\left. + \|f\|_{L_{p_1 \dots p_n}^{l_1 \dots l_n}(D)} h^{\varepsilon_s} \right).$$

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Some Properties of Differentiable Functions of Many Variables

Theorem 4 is a further embedding theorem (an analogue of the theorem in (Ref.7) for the Sobolev spaces W_p^l).

Theorem 5 says that, if D is finite, the set $\{f\}$ is bounded in the norm of

$$\mathfrak{M}^{l_1 \dots l_n}_{p_0 p_1 \dots p_n}(D)$$

and the condition 1) or 2) of theorem 3 is satisfied, then the set

$$\left\{ D^{\nu_1}_{x_1} \dots D^{\nu_n}_{x_n} f \right\}$$

is compact in C or $L_q(D_s)$.

A similar statement refers to theorem 4.

Theorem 6 is a special case of part 3 of theorem 3 and theorem 4, if $D = E_n$ and $h = \infty$.

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Some Properties of Differentiable Functions of Many Variables

Theorem 7 is a partially special inversion of theorem 6.

There are 7 references: 6 Soviet and 1 Italian.

ASSOCIATION: Leningradskoye otdeleniye Matematicheskogo instituta imeni V. A. Steklova Akademii nauk SSSR (Leningrad Branch of the Mathematical Institute imeni V. A. Steklov of the Academy of Sciences USSR)

PRESENTED: July 28, 1960, by V. J. Smirnov, Academician

SUBMITTED: July 21, 1960

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C111/C444

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AUTHORS: Golovkin, K. K., ~~Solonnikov, V. A.~~

TITLE: The first boundary value problem for the non-stationary Navier-Stokes equations

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 2, 1961, 287-290

TEXT: Let Ω be a bounded domain in E_3, which is bounded by the surface s which is of the Lyapunov type with the exponent α. The existence of the classical solution of the problem

$$\frac{\partial u}{\partial t} - \nu \Delta u + \operatorname{grad} p = u_k \frac{\partial u}{\partial x_k} + f, \quad \operatorname{div} u = 0,$$
$$u|_s = 0 \quad u|_{t=0} = a \ (\operatorname{div} a(x) = 0), \tag{6}$$

is proved by consideration of the sequence ($n = 0,1,2,\ldots$) of the linear problems

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The first boundary value problem . . .

$$\frac{\partial u_{n+1}}{\partial t} - \nu \Delta u_{n+1} + \operatorname{grad} p_{n+1} = u_{n,k} \frac{\partial u_n}{\partial x_k} + f,$$

$$\operatorname{div} u_{n+1} = 0, \quad u_{n+1}|_S = 0, \quad u_{n+1}|_{t=1} = a \qquad (7)$$

putting $u_0(x,t) \equiv 0$. The convergence of this process is examined by the method of J. Leray (Ref. 8: J. Leray, J. Math. pures et appl., S. IX, 13, no. 4, 331 (1934)), where the following estimations are used: Consider the problem

$$\frac{\partial u}{\partial t} - \nu \Delta u + \operatorname{grad} p = f(x,t), \quad \operatorname{div} u(x) = 0$$

$$u|_S = u(s,t), \quad u|_{t=0} = a(x), \quad x \in \Omega, \ t > 0 \qquad (3)$$

under the supposition $\int_S (u(s,t) \cdot n(s))\, ds = 0$, $\operatorname{div} a(x) = 0$,

where $n(s)$ is the unit vector of the normal of S. Let $M(\Omega, \beta)$ be

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the space of the vector functions $\mathbf{v}(x)$ which are given in $\Omega + S$, with the finite norm

$$\max_{x,x' \in \Omega+S} \frac{|v(x)-v(x')|}{|x-x'|^{\beta}} + \max_{x \in \Omega+S} |v(x)| \equiv \| v(x) \|_{M(\Omega,\beta)},$$

$$\| u(x,t) \|_{M(\Omega,\beta)} \equiv v_{\beta}(t)$$

1. Let $u(x,t)\big|_S \equiv 0$; $f(x,t) \equiv 0$; $a(x) \in M(\Omega,\beta)$.

Then

$$v_{\beta'}(t) \leq B \| a(x) \|_{M(\Omega,\beta)} e^{-\gamma \nu t}, \qquad (4)$$

where the constant B depends on Ω, β, β' and γ = const only on Ω.

3. Let $u(x,t)\big|_S \equiv 0$, $a(x) \equiv 0$, $f_i(x,t) = \frac{\partial R_{i,j}}{\partial x_j} + F_i$ where

$\sum_{i=1}^{3} \| R_i \|_{M(\Omega,\beta)} \leq \psi(t)$, $\| F \|_{M(\Omega,\beta)} \leq \psi(t)$, where $R_i \equiv (R_{i,1}, R_{i,2}$

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$R_{i,3}$). Then

$$V_\beta(t) < \int_0^t \left\{ \frac{B_\delta \varepsilon |\nu(t-\tau)|}{|\nu(t-\tau)|^{\beta+\delta}} + Be^{-\gamma\nu(t-\tau)} \right\} \varphi(\tau)\, d\tau + \int_0^t \left\{ \frac{B_\delta \varepsilon |\nu(t-\tau)|}{|\nu(t-\tau)|^{\beta}} + Be^{-\gamma\nu(t-\tau)} \right\} \psi(\tau)\, d\tau, \qquad (5)$$

where $\varepsilon(y) = 1$ for $y \leq 1$, $\varepsilon(y) = 0$ for $y > 1$; $\delta > 0$ arbitrary small. The estimations (4), (5) are those mentioned above, they are used for the proof of the convergence of (7).

The final solution is formulated by the author in the following theorem:

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Let

$$\sup_{t>0} |f(x,t)|_{M(\Omega;\beta)} < \infty, \quad \sup_{t,t'>0} \max_{x\in\Omega} \frac{|f(x,t')-f(x,t')|}{|t-t'|^{\beta}} < \infty$$

$$|a(x)|_{M(\Omega,\beta)} < \infty$$

for a certain $\beta > 0$. Then in a certain cylinder $Q \equiv (\Omega \times [0,T])$ there exists the classical solution of (6) (i.e. a solution, being continuous up to the boundary S and to the plane t = 0 and possessing continuous derivatives in Ω which enter in (6)). T is estimated from below by the quantities $\sup_{t>0} \|f(x,t)\|_{M(\Omega,\beta)}$ and $\|a(x)\|_{M(\Omega,\beta)}$; if these are sufficient small then $T = \infty$.

Theorem: The "weak" solution of (6) possesses the derivatives $u_{x_i x_j}$, u_t, p_{x_i}, which are summable in power $\frac{5}{4}$ on Ω.

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The first boundary value problem . . . C111/C444

The author mentions: A. A. Kiselev, O. A. Ladyzhenskaya, P. Ye Sobolevskiy, V. J. Yudovich, O. V. Guseva, S. L. Sobolev

There are 8 Soviet-bloc and 2 non-Soviet-bloc references.

ASSOCIATION: Leningradskoye otdeleniye matematicheskogo instituta imeni V. A. Steklova Akademii nauk SSSR (Leningrad Branch of the Institute of Mathematics imeni V. A. Steklov of the Academy of Sciences USSR)

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SUBMITTED: April 13, 1961

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SOLONNIKOV, V.A.

Simple proof of the Hardy-Littlewood inequality for fractional integrals. Vest. LGU 17 no.13:150-153 '62. (MIRA 15:7)
(Inequalities (Mathematics))

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

GOLOVKIN, K.K.; SOLONNIKOV, V.A.

Imbedding theorems for fractional spaces. Dokl. AN SSSR 143 no.4:767-770 Ap '62. (MIRA 15:3)

1. Leningradskoye otdeleniye Matematicheskogo instituta im. V.A. Steklova AN SSSR. Predstavleno akademikom V.I.Smirnovym.
(Spaces, Generalized) (Distance geometry)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

IL'IN, V.P.; SOLONNIKOV, V.A.

Some properties of differentiable functions of several variables.
Trudy Mat.inst. 66:205-226 '62. (MIRA 15:11)
(Functions of several variables)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

SOLONNIKOV, V.A.

Evaluations of solutions to general boundary value problems for elliptic systems. Dokl. AN SSSR 151 no.4:783-785 Ag '63. (MIRA 16:8)

1. Predstavleno akademikom V.I.Smirnovym.
(Boundary value problems) (Differential equations)

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"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652310001-2

GOLOVKIN, K.K.; SOLONNIKOV, V.A.

Evaluations of integral operators in translational-invariant norms. Trudy Mat. inst. 70:47-58 '64. (MIRA 17:5)

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S/0038/64/028/003/0665/0706

ACCESSION NR: AP4040435

AUTHOR: Solonnikov, V. A.

TITLE: On general boundary value problems for systems which are elliptic in the sence of A. Douglis and L. Nirenberg. 1

SOURCE: AN SSSR. Izvestiya. Seriya matematicheskaya, v. 28, no. 3, 1964, 665-706

TOPIC TAGS: boundary value problem, elliptic system, constant coefficients, construction of potentials, differential equation, differential operator, Lopatinskiy condition, algebraic condition

ABSTRACT: The author finds algebraic conditions on certain matrices which he calls conditions of complementation in the case of systems which are elliptic according to I. G. Petrovskiy, equivalent to the condition of Lopatinskiy. He studies the boundary value problem for an elliptic equation of order 2r:

$$L\left(x, \frac{\partial}{\partial x}\right) u = f, \qquad (1)$$

$$B_q\left(x, \frac{\partial}{\partial x}\right) u\Big|_S = \Phi_q \quad (q = 1, \ldots, r). \qquad (2)$$

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is valid. The author obtains limiting precise a priori estimates of solutions of general boundary value problems for systems which are elliptic in the sense of A. Douglis - L. Nirenberg in a wide class of norms, including W_p^l and C^α. He constructs a regularizer, proves normal solvability of these problems in the given spaces, and studies differential properties of the solution depending on the data of the problem. In particular, he studies boundary value problems for systems with constant coefficients in the half space. He finds the solution of these problems in explicit form with the help of specially.constructed potentials. Here he relies on results by Ya. B. Lopatinskiy (Ob odnom sposobe privedeniya granichny*kh zadach dlya sistemy* differentsial'ny*kh uravneniy ellipticheskogo tipa k regulyarny*m integral'ny*m uravneniyam. Ukr. mat. zhurnal, 5, No. 2 (1953), 123-151) and S. Agmon, A. Douglis, and L. Nirenberg (Estimates near the boundary for solutions of elliptic partial differential equations satisfying general boundary conditions. I, Comm. Puro Appl. Math. XII (1959, 623-727). Orig. art. has: 59 formulas.

ASSOCIATION: none

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ACCESSION NR: AT4039373 S/2517/64/070/000/0133/0212

AUTHOR: Solonnikov, V. A.

TITLE: A priori approximations for second-order parabolic equations

SOURCE: AN SSSR. Matematicheskiy institut. Trudy*, v. 70, 1964. Krayevy*ye zadachi matematicheskoy fiziki (Boundary value problems in mathematical physics), no. 1, 133-212

TOPIC TAGS: mathematical physics, boundary value problem, boundary problem, approximation calculation, differential equation, Dirichlet problem, eigenvalue, parabolic equation, heat exchange, thermal conductivity

ABSTRACT: It is well-known that a priori approximations of the solutions of various problems connected with partial derivatives play an important role in the theory of differential equations. These approximations create the possibility of proving the solvability of these problems. Let us consider, for example, the compound problem for the equation of thermal conductivity in a bound region Ω with boundary S

$$u_t(x, t) - \Delta u(x, t) = f(x, t) \quad (x \in \Omega, t \in [0, T]), \tag{1}$$
$$u|_{t=0} = u_0(x),$$
$$u|_{x \in S} = \varphi(x, t).$$

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It is know that if $f \in C^{\alpha, \frac{\alpha}{2}}$ (i.e., f satisfies the Holder condition with property α along the variable x and with property $\alpha/2$ along the variable t),

$$u_0 \in C^{2+\alpha}, \varphi \in C^{2+\alpha, 1+\frac{\alpha}{2}}, \text{ то } u \in C^{2+\alpha, 1+\frac{\alpha}{2}}_{\bar{Q}_T}$$

$$|u|_{\bar{Q}_T}^{2+\alpha, 1+\frac{\alpha}{2}} \leq C\left[|f|_{Q_T}^{\alpha, \frac{\alpha}{2}} + |u_0|_{\bar{\Omega}}^{2+\alpha} + |\varphi|_{\Sigma_T}^{2+\alpha, 1+\frac{\alpha}{2}}\right]. \quad (2)$$

Thus, the boundary S of the region Ω should belong to the class $C^{2+\alpha}$.

If $\varphi = 0$, $f \in L_2$, $u_0 \in \overset{\circ}{W}{}_2^1(\Omega)$, then the function u has quadratic-summation derivatives u_t, u_{x_i}, $u_{x_i x_j}$ and holds for the inequality

$$|u_t|_{L_2(Q_T)} + \sum_{i,j=1}^{n} |u_{x_i x_j}|_{L_2} + \sum_{i=1}^{n} |u_{x_i}|_{L_2} + |u|_{L_2} \leq \quad (3)$$

$$\leq C\left(|f|_{L_2} + |u_0|_{L_2(\Omega)} + \sum_{i=1}^{n} |u_{x_i}|_{L_2}\right).$$

There exists an analogous approximation for results of a more general parabolic equation of the second order. In the present work an approximation of the norm L_p ($p > 1$) of the derivatives u_t, $u_{x_i x_j}$ and their subordinates is obtained. Among the main topics

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discussed are the spaces $\mathcal{L}_p^{l_1,\ldots,l_n} \text{ и } L_p^{l_1,\ldots,l_n}$ and some of their properties. The author considers the functions given in n-dimensional Euclidean space E_n. The point of this space with coordinates $x_1, x_2, \ldots, x_n$ is denoted by x. The region of the space E_n with the inequalities $x_{s+1} \geqslant 0, x_{s+2} \geqslant 0, \ldots, x_n \geqslant 0$ $(0 \leqslant s \leqslant n)$ is denoted by $A_s^{(n)}$, such that the positive semiaxis, for example, is denoted by $A_0^{(1)}$. The following usual notation is used:

$$D_i^m f = \frac{\partial^m f}{\partial x_i^m}, \quad \Delta_{i,h}^m f(x) = \sum_{j=0}^{m} (-1)^{m-j} C_m^j f(x_1, \ldots, x_{i-1}, x_i + jh, x_{i+1}, \ldots, x_n), \tag{4}$$

$$\|f\|_{L_p(\Omega)} = \left(\int_\Omega |f(x)|^p \, dx \right)^{\frac{1}{p}}.$$

Let $l \geqslant 0$. The largest whole number less than l is denoted by $\tilde{l}$; further, $\bar{\lambda} = l - \tilde{l}$, such that $0 < \bar{\lambda} \leqslant 1$. Given n positive numbers l_i, the author finally obtains the following norms:

$$\|f\|_{W_p^{l_i}(A_0^{(n)})} = \left(\int_0^\infty \| \Delta_{i,h}^{\tilde{l}_i+1} D_i^{\tilde{l}_i} f \|_{L_p(A_0^{(n)})}^p \frac{dh}{h^{1+\bar{\lambda}_i}} \right)^{\frac{1}{p}}, \tag{5}$$

$$\|f\|_{W_p^{l_1,\ldots,l_n}(A_0^{(n)})} = \sum_{i=1}^{n} \|f\|_{W_p^{l_i}(A_0^{(n)})}$$

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In the course of the presentation, 17 theorems are proven. Orig. art. has: 160 formulas.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR (Institute of Mathematics, AN SSSR)

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SOLONNIKOV, V.A.

General boundary value problems for systems elliptic in the sense of A.Douglis - L. Nirenberg. Part. 1. Izv. AN SSSR. Ser. mat. 28 no.3:665-706 My-Je '64. (MIRA 17:6)

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ACCESSION NR: AT4039374 S/2517/64/070/000/0213/0317

AUTHOR: Solonnikov, V. A.

TITLE: Evaluation of the solutions of a transient, linearized system of Navier-Stokes equations

SOURCE: AN SSSR. Matematicheskiy institut. Trudy*, v. 70, 1964. Krayevy*ye zadachi matematicheskoy fiziki (Boundary value problems in mathematical physics), no. 1, 213-317

TOPIC TAGS: boundary value problem, hydrodynamics, mathematical physics, boundary problem, applied mathematics, differential equation, differential solution, Green function, integration, linear system, linear function, nonlinear differential equation, nonlinear system, tensor analysis, vector analysis, potential, potential theory, Navier Stokes equation

ABSTRACT: The author discusses the solutions of the problem connected with the linearized system of Navier-Stokes:

$$\frac{\partial v}{\partial t} - \Delta v + \operatorname{grad} p = f, \qquad \operatorname{div} v = 0. \tag{1}$$

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and points out that a detailed analysis of the linearized problem is extremely useful for a study of the nonlinear system:

$$\frac{\partial v}{\partial t}+\sum_{k=1}^{3} v_k \frac{\partial v}{\partial x_k}-\Delta v+\operatorname{grad} p=f. \qquad (2)$$
$$\operatorname{div} v=0,$$

describing the movement of a viscous, incompressible fluid (v is a velocity vector and p is a compression vector). However, the linearized system (1) also presents a definite interest from a purely mathematical point of view, insofar as it is not contained in an investigated class of systems of differential equations and has clear specificity. The first problem concerning a representation in the form of potential solutions of the system (1), satisfying the condition on the boundary $v/_S=a$, was solved by J. Leray (Essai sur les mouvements plants d'un liquide visqueux que limitent des parois. J. Math. pures et appl., S. I_X, t. 13, Fasc. No. 4, 1934). He considered the system (1) at the surface and constructed a solution of the problem:

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$$\frac{\partial G_{ij}}{\partial t}-\Delta G_{ij}+\frac{\partial p_j}{\partial x_i}=0,$$

$$\sum_{i=1}^{3}\frac{\partial G_{ij}}{\partial x_i}=0, \qquad (3)$$

$$G_{ij}|_{t=0}=\delta_{ij}\delta(t)\delta(x_1); \quad i, j=1, 2$$

for the half space $x_2>0$, $-\infty < t$, $x_1 < \infty$ (for negative $tG_{ij} = 0$). This solution is a nucleus of the potential of the double layer for the system (1) in the case of a half space. With the aid of this solution, J. Leray constructed a theory of potential for a convex field, and obtained an estimate for the function $v(t) = \max | v(x, t) |$. In the work of K. K. Golovkin (Teoriya potentsialov dlya nestatsionarny*kh lineyny*kh uravneniy Navier-Stokes v sluchaye trekh prostranstvenny*kh peremenny*kh. Tr. MIAN SSSR, t. LIX, 1960, 87-99)' the nucleus of the potential of the double layer is constructed for the system (1) in the case of triple space applications, i.e. the solution of the problem:

$$\frac{\partial G_{ij}}{\partial t}-\Delta G_{ij}+\frac{\partial P_{ij}}{\partial x_i}=0,$$

$$\sum_{i=1}^{3}\frac{\partial G_{ij}}{\partial x_i}=0, \qquad (4)$$

$$G_{ij}|_{t=0}=\delta_{ij}\delta(t)\delta(x_1)\delta(x_2), \quad i, j=1, 2, 3,$$

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which is analogous to problem (3). For this solution (more precisely, for the function G_{ij} at $i = 1, 2, 3$, $j = 1, 2$, appearing in the sense of the major tensor G_{ij}) an estimate is obtained in the work of Golovkin. This estimate differs from the estimate of the present paper:

$$|D_x^{\alpha} D_{x_0}^{k} D_t^{m} G_{ij}| < \frac{C}{t^{\frac{1}{3}+m}(x^3+t)^{\frac{|\alpha|+3}{3}}(x_0^3+t)^{\frac{k}{3}}}, \qquad (5)$$

only in the case of the index $k \neq 0$, in which case the present paper uses the multiplier $1/t^k$ instead of $1/(x\frac{2}{3}+t)^{k/2}$. With the help of the tensor G_{ij}, Golovkin constructs the theory of potential for the system (1). Further, he estimates the solution of the Cauchy problem and the composite problem for the system (1) with zero initial and end conditions. The following estimate was obtained:

$$\sum_{i=1}^{3}\left|\frac{\partial u_i}{\partial t}\right|_{t=t(x)} + \sum_{i,j,k=1}^{3}\left|\frac{\partial^2 u_i}{\partial x_j \partial x_k}\right|_{t=t(x)} < C\sum_{i=1}^{3}|f_i|_{t=t(x)}, \qquad (6)$$

$$\sum_{i=1}^{3}\left|\frac{\partial u_i}{\partial t}\right|_{t=t(x)} + \sum_{i,j,k=1}^{3}\left|\frac{\partial^2 u_i}{\partial x_j \partial x_k}\right|_{t=t(x)} < C\sum_{i=1}^{3}|f_i|_{t=t(x)}$$

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where D_4 is the half space $t \geq 0$ of the space E_4 (x_1, x_2, x_3, t), Q is the cylinder $\Omega \times (0, T)$ in the space E_4, u_i is the solution of the Cauchy problem, and v_i is the solution of the composite problem. The present, rather lengthy paper is divided into four chapters, the first of which contains auxiliary propositions. In the second chapter the Cauchy problem, the boundary problem in the half space $x_3 \geq 0$ with $-\infty < t < \infty$, and the composite problem in the field $x_3 \geq 0$, $t \geq 0$ for the system (1) are considered. In the third chapter an estimate of the solution of the given problem is obtained at the norms, precisely at the characteristic norm. In the fourth chapter an estimate for an organic region with a smooth boundary is proved. A total of 16 theorems is presented. "The author expresses thanks to K. K. Golovkin for his useful conversations". Orig. art. has: 214 formulas.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR (Institute of Mathematics, AN SSSR)

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SOLOMNIKOV, V.A.

Boundary value problems for general linear parabolic systems.
Dokl. AN SSSR 157 no.1:56-59 Jl '64 (MIRA 17:8)

1. Predstavleno akademikom V.I. Smirnovym.

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ACCESSION NR: AT5018143 UR/2517/64/073/000/0221/0291

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AUTHOR: Solonnikov, V. A.

TITLE: On the differential properties of the solution of the first boundary value problem for nonstationary systems of Navier-Stokes equations

16

SOURCE: AN SSSR. Matematicheskiy institut. Trudy, v. 73, 1964. Krayevyye zadachi matematicheskoy fiziki (Boundary value problems in mathematical physics); sbornik rabot, no. 2, 221-291

TOPIC TAGS: Navier-Stokes equation, boundary value problem, hydrodynamics boundary value problem, potential theory

ABSTRACT: In continuation of the author's previous work on estimates of solutions of the first boundary value problem for linearized nonstationary systems of Navier-Stokes equations in a bounded cylindrical region, extension is now made to Hölder classes defined with fractional indices. The differential properties of functions belonging to the designated Hölder classes are stated, and on this basis a theorem is proved for the estimate of the solution of the first boundary value problem. Supplementary estimates are made--in connection with the proof of this theorem--for

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solutions in a half-space, near the boundary, and inside the region. Conditions are stated for which the estimates are valid and the differential properties of the solution are discussed. Orig. art. has: 436 formulas.

ASSOCIATION: none

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ACCESSION NR: AP4046365 S/0020/64/158/003/0532/0535

AUTHOR: Solonnikov, V. A. B

TITLE: Estimates of basic matrices for general parabolic systems with constant coefficients 16

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 532-535

TOPIC TAGS: parabolic equation, matrix function, differential operator, linear differential equation, boundary value problem, ordinary differential equation, analytic function

ABSTRACT: This paper is devoted to an estimate of the basic matrix for the construction of the solution of a general boundary problem for a homogeneous parabolic system with constant coefficients in a half space. The original problem

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$$\mathcal{L}_0\left(\frac{\partial}{\partial x}, \frac{\partial}{\partial t}\right) u(x, t) = 0, \quad B_0\left(\frac{\partial}{\partial x}, \frac{\partial}{\partial t}\right) u(x, t)\Big|_{x_n=0} = \Phi(x', t), \qquad (1)$$

where $\mathcal{L}_0$ and B_0 are matrices whose elements are linear differential operators with complex coefficients has, after taking the Laplace transform in the x and t, a solution

$$u_j(x, t) = \sum_{q=1}^{R} \int_{-\infty}^{+\infty} d\tau \int_{B_{n-1}} G_{jq}(x' - y', x_n, t - \tau)\, \Phi_q(y', \tau)\, dy',$$

where

$$G_{jq}(x, t) \frac{1}{(2\pi)^{n-1} 2\pi i} \int_{B_{n-1}} e^{i(x', \zeta)} d\zeta \int_{\sigma-i\infty}^{\sigma+i\infty} e^{pt} \tilde{G}_{jq}(\zeta, p, x_n)\, dp, \qquad (3)$$

with G_{jk} being a solution of a simplified boundary-value problem for a system of ordinary differential equations. Although the functions (3) were estimated for parabolic systems by others, the earlier results are doubtful because analyticity of G_{jq} was either not proved

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or proved under insufficiently founded assumptions. A different proof for analyticity of G_{jq} is presented in this article. This report was presented by V. I. Smirnov. Orig. art. has: 7 formulas.

ASSOCIATION: Leningradskoye otdeleniye Matematicheskogo instituta im. V. A. Steklova Akademii nauk SSSR (Leningrad Division, Mathematics Institute, Academy of Sciences SSSR)

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[redacted], V.I.

different al properties of the solution to the first boundary value problem for a constationary system of Navier-Stokes equations. Trudy Mat. Inst. 73:221-291 '64.

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at an addition of 2% Si to boron carbide a lighter colored phase forms (Fig 1b). The amount of this phase varies only little up to a 20% Si-content, whereas in the case of 28% Si it increases considerably (Fig 1v). In the latter casethe microhardness attains 2000 kg/mm^2. It remains practically constant in the case of further Si-increase (Fig 2a). This phase is apparently a saturated solid solution of boron and carbon (or boron carbide) in silicon. In the case of 25% Si the microstructure shows clear separations of the chemical compound (Fig 1g). The hardness of the second phase increases with increasing silicon-content in the alloy and attains a maximum of $\sim$ 7000 kg/mm^2 in the case of an Si-content of 40-50% by weight. It then decreases to 3500-4000 kg/mm^2 (Fig 2b). From 50% silicon onwards a fine-grained eutectic becomes visible between the grains of the silicon- and carbide phase (up to 80% Si-content in the alloy). On an addition of 20% Si to boron carbide the X-ray investigation shows the appearing lines of a new phase. They are most clear at 35-40% Si; at 50-70% Si they pass over into the lines of the solid solution of boron and carbon in silicon, which are well marked at 75% Si (Fig 3). The maximum of electric resistance of the samples is attained at 28-35% Si in the alloys. From the above it is

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possible to draw a conclusion on the formation of a ternary phase of boron with silicon and carbon which may have the composition B_5SiC_2. Its hardness of ~7000 kg/mm^2 explains its high grinding capacity (Ref 9). This phase has a constant resistivity to oxidation in air, at least up to 1200°, to mineral acids and their mixtures also in the case of boiling. There are 3 figures and 9 references, 5 of which are Soviet.

ASSOCIATION: Vsesoyuznyy institut aviatsionnykh materialov (All-Union Institute of Aviation Material). Institut metallokeramiki i spetssplavov Akademii nauk SSSR (Institute of Powder Metallurgy and Special Alloys of the Academy of Sciences USSR)

PRESENTED: December 16, 1958, by A. A. Bochvar, Academician

SUBMITTED: December 16, 1958

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B015/B064

AUTHORS: Portnoy, K. I., Samsonov, G. V., Solonnikova, L. A.

TITLE: Melts in the System Boron - Silicon - Carbon

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 9, pp. 2032-2041

TEXT: The conditions of synthesis and properties of some B-Si-C melts were determined by microscopic-, X-ray-, microanalytical-, and chemical analyses, and the melting temperature and electrical properties of the melts B_4C-Si and SiC-B were determined. On investigating B_4C-Si melts, chemical analyses (Table 1) showed that a silicon content is found in the mixture which is close to the theoretical value of 25-35 wt% Si. When determining the specific weight (Table 2) a maximum value was found to be attained at approximately 30% Si, which may be traced back to the formation of a new phase with denser packing. At an Si content of 10-50% the melting point varies between 2200° and 2400°C, to decrease at 70% Si to 1600°-1700°C. At an Si content of approximately 25 wt% in the alloy, a hardness maximum of about 7000 kg/mm^2 was found to exist, where also a maximum of electrical resistance, and a minimum of thermo-electromotive force was determined, and the

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